

PRACTICAL SKILLS

413 - Team 4

16

QUICKFIT APPARATUS

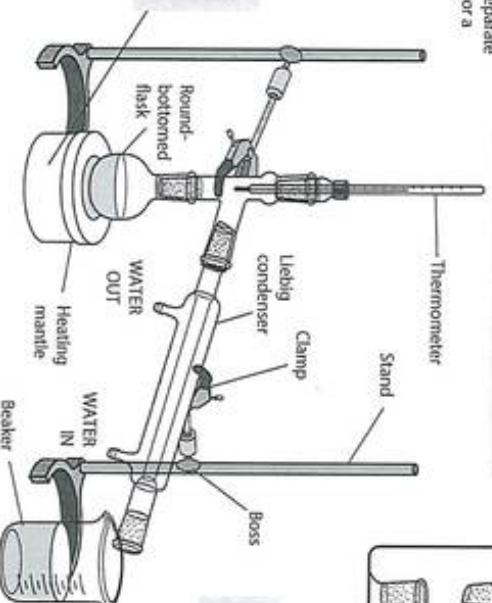
Quickfit apparatus is a brand of glassware commonly used in school laboratories.

It has joints which easily fit together and clamps to hold the joints in place.

DISTILLATION

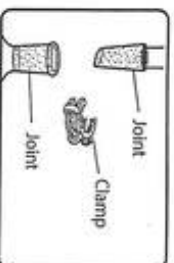
To separate two liquids, the **thermometer** is used to monitor the temperature so only the desired liquid evaporates.

Distillation is used to separate liquids mixed together, or a liquid from a solution.



The vapours move into the condenser and the vapour **condenses**.

Tip: It is important to have water coming in through the bottom of the condenser and out of the top. This avoids air bubbles and allows efficient cooling.

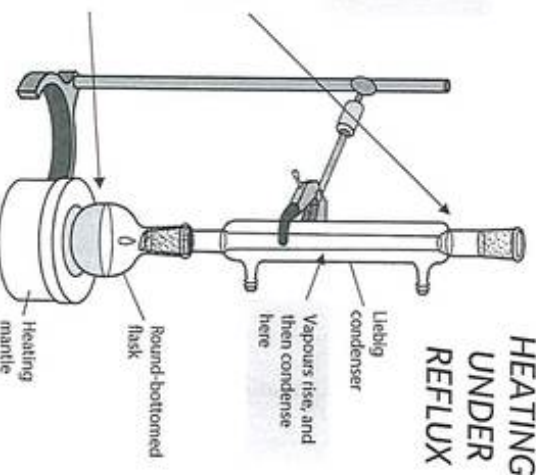


USING REFLUX

Heating under reflux is an important technique in synthesis which allows **constant heating** without losing any solvent/reactants/products.

As the reaction mixture in the flask is heated, it may begin to boil. The vapours move up the **condenser**, are cooled, and then condense and drip back into the flask.

The **top is open**, allowing gases to expand when heating begins. If the system was closed (if a bung was inserted into the top), the glass could shatter.

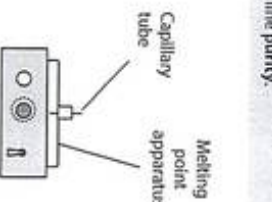
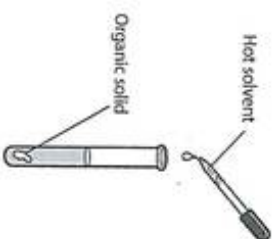
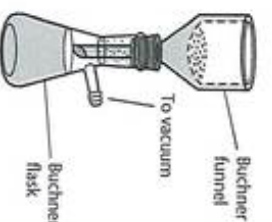


HEATING UNDER REFLUX

PREPARING AND PURIFYING ORGANIC SOLIDS

RECRYSTALLISATION

1. Dissolve in minimum amount of **hot solvent**.
2. **Filter under reduced pressure** while hot to remove insoluble impurities.
3. This is a way of speeding up the filtration process and removing more filtrate.
4. Collect filtrate in ice bath to form **crystals**.
5. Once crystals form, **filter** to remove organic impurities.
6. Wash with a little ice-cold solvent to remove any remaining impurities.



MELTING POINT

Once the crystals are dry, their **melting point** can be tested using melting point apparatus. A small amount of the solid is placed into a capillary tube and then heated up slowly. A magnifier is used to observe the range of temperature when melting happens. This can be compared to known values to determine **purity**.

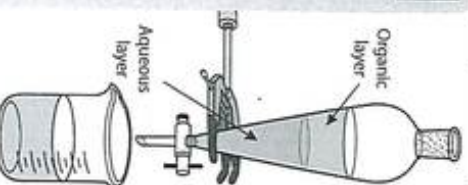
PREPARING AND PURIFYING ORGANIC LIQUIDS

After a reaction, an organic liquid needs to be purified before it can be used.

SEPARATING FUNNEL

A separating funnel can be used to remove water-soluble impurities.

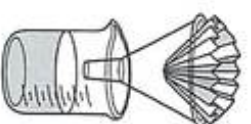
1. Carefully add water to the reaction mixture then pour into a separating funnel.
2. Place lid on, then invert repeatedly, releasing the pressure occasionally.
3. Remove lid then open the tap to collect the aqueous layer at the bottom in a beaker.
4. The product will normally be in the top, organic layer.
5. This process can be repeated by washing the organic layer with further water.



DRYING USING ANHYDROUS SALT

A **drying agent** such as anhydrous $MgSO_4$ or $CaCl_2$ removes any leftover water dissolved in the organic liquid after separating.

Add the solid drying agent to the flask in excess, swirl, and then use a filter to remove the solid, which is disposed of.



REDISTILLATION

Redistillation is a method of purification where a liquid is distilled again at the end of a purification process to ensure complete purity.

